

CLAIMS:

1. A memory controller for accessing a memory having a plurality of blocks each constituted of a plurality of pages based on a host address supplied from a host computer, comprising:

5 decision means responsive to a request to write user data issued by the host computer for determining whether progressive data writing for writing user data to a target page designated by the host address is possible; and

10 write means responsive to an affirmative determination by the decision means for writing user data to the target page without performing an inter-block data transfer.

2. The memory controller as claimed in claim 1, wherein the decision means makes the determination by referring to a table in which free page information concerning at least a part of the plurality of blocks is stored.

3. The memory controller as claimed in claim 2, wherein the write means writes at least a part of new free page information resulting from writing user data to at least one page included in the block which includes the target page.

4. The memory controller as claimed in claim 2, wherein the free page information includes at least first information indicating whether any free pages exist and second information designating the free pages.

5. The memory controller as claimed in claim 3, wherein the free page information includes at least first information indicating whether any free

pages exist and second information designating the free pages.

6. The memory controller as claimed in claim 4, further comprising
table generating means for generating the table based on the first
5 information read from a top page of at least a part of the plurality of
blocks.

10 7. The memory controller as claimed in claim 5, further comprising
table generating means for generating the table based on the first
information read from a top page of at least a part of the plurality of
blocks.

15 8. The memory controller as claimed in claim 2, wherein the free page
information contained in the table is composed of items of start page
information indicating those pages among the pages contained in
corresponding blocks that are top pages of sets of one or more pages, which
top pages and all following pages are free pages.

20 9. The memory controller as claimed in claim 3, wherein the free page
information contained in the table is composed of items of start page
information indicating those pages among the pages contained in
corresponding blocks that are top pages of sets of one or more pages, which
top pages and all following pages are free pages.

25 10. A memory controller for accessing a memory having a plurality of
blocks each constituted of a plurality of pages based on a host address
supplied from a host computer, comprising:

write means responsive to a request to write user data to a free block issued by the host computer for writing user data to a user area of a page included in the free block that is a first page designated by the host address; and

5 means for writing free page information to a redundant area of a top page included in the free block.

10 11. The memory controller as claimed in claim 10, wherein the free page information includes at least a free page flag indicating whether any free pages exist or not and free page data designating the free pages.

12. The memory controller as claimed in claim 11, wherein the free page data designate a second page following the first page.

15 13. The memory controller as claimed in claim 12, further comprising:
decision means responsive to a request to write user data to the block issued by the host computer for determining based on the free page information whether progressive data writing for writing user data to a third page designated by the host address is possible;

20 write means responsive to an affirmative determination by the decision means for writing user data to the user area of the third page included in the block; and

25 write means for writing free page data designating a fourth page following the third page to the redundant area of the second page included in the block.

14. The memory controller as claimed in claim 11, further comprising:

decision means responsive to a request to write user data to a last page of the block issued by the host computer for determining based on the free page information whether progressive data writing for writing user data to the last page is possible;

5 write means responsive to an affirmative determination by the decision means for writing user data to the user area of the last page; and
 means for changing the free page flag stored in the redundant area of the top page.

10 15. The memory controller as claimed in claim 12, further comprising:
 decision means responsive to a request to write user data to a last page of the block issued from the host computer for determining based on the free page information whether progressive data writing for writing user data to the last page is possible;

15 write means responsive to an affirmative determination by the decision means for writing user data to the user area of the last page; and
 means for changing the free page flag stored in the redundant area of the top page.

20 16. The memory controller as claimed in claim 13, further comprising:
 decision means responsive to a request to write user data to a last page of the block issued by the host computer for determining based on the free page information whether progressive data writing for writing user data to the last page is possible;

25 write means responsive to an affirmative determination by the decision means for writing user data to the user area of the last page; and
 means for changing the free page flag stored in the redundant area

of the top page.

17. A flash memory system comprising a flash memory having a plurality of blocks each constituted of a plurality of pages and a memory controller for accessing the flash memory based on a host address supplied from a host computer, the memory controller comprising:

10 decision means responsive to a request to write user data issued by the host computer for determining whether progressive data writing for writing user data to a target page designated by the host address is possible; and

write means responsive to an affirmative determination by the decision means for writing user data to the target page without performing an inter-block data transfer.

15 18. The flash memory system as claimed in claim 17, wherein each block has a user area and a redundant area in which free page information for the corresponding block is stored.

19. The flash memory system as claimed in claim 18, wherein the memory controller further comprises a table in which the free page information concerning at least a part of the plurality of blocks is stored, and the decision means makes the determination by referring to the table.

20. A method for controlling a flash memory, comprising:
25 a determining step conducted in response to a request to write user data issued by a host computer of determining whether progressive data writing for writing user data to a target page designated by the host

address is possible; and

a writing step conducted in response to an affirmative determination in the determining step of writing user data to the target page without performing an inter-block data transfer.

2025.07.17 10:03:49